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THE JOURNAL OF PHILOSOPHY

VOL XXXI. NO. 19: SEPTEMBER 13, 1934

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PUBLISHED FORTNIGHTLY

BY THE

JOURNAL OF PHILOSOPHY, INC.

THE JOURNAL OF PHILOSOPHY

EDITORS: Frederick J. E. Woodbridge, Wendell T. Bush, Herbert W. Schneider.

BOOK EDITORS: George Boas, Harry T. Costello, Irwin Edman, Horace L. Friess, Moritz A. Geiger, Sterling P. Lamprecht, Harold A. Larrabee, Richard McKeon, Arthur E. Murphy, Ernest Nagel, Robert Scoon.

THE JOURNAL OF PHILOSOPHY is owned by the Journal of Philosophy, Inc., 515 West 116th Street, New York, and published fortnightly at Lancaster, Pa. President, Wendell T. Bush; Vice-President, Herbert W. Schneider; Treasurer, Frederick J. E. Woodbridge; Secretary, Iris Dean.

Communications to the editors should be addressed, Columbia University, New York. Subscriptions and advertisements should be sent to THE JOURNAL OF PHILOSOPHY, 515 West 116th Street, New York, or Prince and Lemon Streets, Lancaster, Pa. The annual subscription price (twenty-six numbers) is $4.00. The price of single numbers is 20 cents, except the annual bibliography number, the price of which is $1.00. Advertising rates will be forwarded on application.

Entered as second class matter, March 18, 1921, at the Post Office at Lancaster, Pa., under Act of Congress of March 3, 1879.

Publishers: G. E. STECHERT & CO., New York—DAVID NUTT, London—NICOLA ZANICHELLI, Bologna—FÉLIX ALCAN, Paris—AKADEMISCHE VERLAGSGESELLSCHAFT, m. b. H. Leipzig—RUIZ HERMANOS, Madrid—F. MACHADO & CIA, Porto—THE MARUZEN COMPANY, Tokyo.

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VOL. XXXI, No. 19 SEPTEMBER 13, 1934

THE JOURNAL OF PHILOSOPHY

THE MATERIAL WORLD

VERY likely the term "matter" has no longer much significance in scientific usage, although it is still found in elementary physics textbooks, and frequently graces book and chapter headings. Even so, I have no desire to rescue a concept which may have become a convenient waste basket for the refuse of outworn notions. To avoid this misappropriation of a very necessary receptacle, I will not take the position of urging any acceptable redefinition or rehabilitation of the term, but rather will attempt some description of the change that has taken place in the function that the term has served. My general aim is to reënact an oft-repeated process, namely, the restatement of certain specific changes in a way that has wider significance, which may, therefore, lead to a better understanding.

In ordinary life we mean by material things, I suppose, the kind of things that we can get our hands on. This has implications to which I will return later. For the moment, let us but note that ordinarily actions and causal changes are related to this kind of things. Correspondingly, in the world of physics, some feel a difficulty in the assertion that there are waves, for example, without saying that there are waves of *something*. Various words have satisfied this feeling. Without being prejudiced by these suppositions or by any others, so far as we can help ourselves, let us see what it means, in ordinary language, to assert the existence of something material.

The primary significance of the statement "there is an x" is an identification of an object. I am describing the relations of the statement to the situation in which it occurs rather than the formal logical properties of the proposition. On the more ordinary occasions of the statement, the word "there" points to a thing present to the organism, about which meanings are expressed or indicated by the predicate which I have indicated in "x." This usage is primary because, however mistaken we may be when we attribute certain meanings to the thing pointed out by "there," the thing itself is present and hence unquestionable. It is not hypothetical, however questionable "what it is" may be.

A second degree removed is the use of the statement "there is

an x'' in an indirect manner, i.e., when the thing is not present, but would be present under certain circumstances. ''There is a table in the next room'' means in all common sense that if we were in the other room, etc., etc., we would perceive a table. The speaker assumes a perspective involving a table being present. The psychological mechanism of this assumption of a different perspective is a social phenomenon, I suppose, for it only occurs in a socialized individual. That, however, is irrelevant to our purpose except for a brief mention later on. Involved in the assumed perspective is an identification of a thing present as a focus of meanings.

Perhaps in a naïve sense, something of this second-degree use of the statement ''there is an x'' quite frequently enters into the meaning of such statements as ''there are atoms'' or ''there are electrons,'' particularly when emphasis is placed on pictures or models. If we could see finely enough we would see something like the picture or model. I need not go into detail to point out that the ordinary theory of the atom would immediately offer difficulties to such a statement. It would, for example, preclude in that instance the usual account of seeing by reflected light, and even aside from that difficulty it would imply that electrons could only be seen when they didn't exist. In short, the statement is too preposterous to merit extended analysis. To be sure, there are perceptual phenomena on which meanings are focused, as when the physicist photographs an ionized ''track of a particle'' in a gas or liquid, or observes the saltatory motion of a minute globule of oil between two electrodes. But the fact still remains that these perceptual phenomena are not in any ordinary sense the things in question. Again, one may permit his imagination to enlarge on the possibilities of the television-microscope, but however amazing and unforeseen the results may be they will be irrelevant to our problem.

The fact is that in his busier moments, no one seems bothered about any perceptual or sensory properties of the atom. A black and white band of well-differentiated spectral lines is more useful than the brilliant hues of the rainbow. Violet and red designate frequencies rather than colors. The birth cries of atoms shriek in the ears of the physicist only in his more mystic, or more journalistic, moments. In their silent and invisible depths they pursue their way as untouched by the feelings of observers as the pre-Cambrian heavens. It is a blind man's world. It is a deaf man's world. Perchance it is a dead man's world.

The so-called secondary or consummatory qualities have never been essential characteristics of matter from Democritus until to-day. Similarly, if we return to our primary meaning of the statement ''there is an x,'' we would see that the perceptual is not the central

point of the situation. It is rather the occasion or the stimulus of the problem. The ordinary man thinks he is getting down to reality when he has something tangible—when he can get a hold on something. The common use of the word "grasping" for "understanding" has a literal basis. Anything has that sort of reality which it exhibits when one has it between his thumb and fingers.

"Tangible," of course, has as its root meaning "touch," and touch is closely allied to grasping. However, if touch were the important factor in this grasping, we would have a very curious problem on our hands. Surely touch is as much a sensory quality as is color, sound, or taste. Yet touch has been said to be peculiarly the final test of reality for every dubious Thomas, and the basis of explanation. There is something mysterious about action at a distance. But say that this billiard ball is moving because another struck it, and the mystery is solved. The fact that equally mysterious factors, such as elasticity, are involved, is apparently irrelevant.

Yet there is a point missed. Grasping and holding are not merely affairs of touch, for what is at the tips of the fingers may escape. Grasping and holding involves resistance, size, and shape; and it is these qualities which have most often been associated with matter. The Democritean atom was something that a small man might have gotten between his thumb and fingers. This distinction drawn in favor of grasping rather than touch indicates that manipulation is basic to the meaning of what things are. The importance of the hand in the development of man has been noted often enough, and the operational or manipulatory account of meaning may be considered to be established in psychology. The hand, then, establishes a manipulatory field that intervenes between the stimulus and the consummatory act. To come back to the more primitive meaning of matter is therefore to come back to the more primitive means of finding out what things potentially are. As matter the thing has possibilities; it is something to be manipulated and investigated. The determination of its possibilities is the determination of its nature. Matter is manipulative and instrumental.

There is, however, a further point to clear up. If one places matter and the actualization of its nature in a temporal order with a temporal distance between them, I mean a real time of the passage of happenings, he has got inevitably to reintroduce consummatory qualities. Aristotle did this, setting up a qualitative physics. But as soon as the physicist became experimental, he started building his system in terms of manipulatory concepts that had no place for the qualities of Aristotle's world. The physicist was a doer rather than a contemplator, and he declared his independence of Aristotle in loud, repeated, and vigorous terms. The "nature" in which he was

interested had action as its prime assumption, rather than rest, and looked forward only to more action in which the result is always identical with the antecedent, *Ex nihilo nihil fit*. Matter and nature were thus identified, making the consummatory qualities mere epiphenomena or subjective vagaries. Coincident with this, of course, was in general a certain pride in refusing to consider human enjoyment and "consumption" as having any meaning for science. That phase could be left to such empirics as, shall we say, Marconi, Bell, Edison, and others. Science was the extension of the manipulatory field intervening between stimulus and consummation.

So far as a quality simply happens or appears in experience, let us call it consummatory. If we would not wait for the future to reveal the further characters of the thing, if we would anticipate the future, we must know what the "nature" of the thing may be upon which we may depend. In this sense we read into the thing a character whose full existence would be reached only at the end of a proposed act. This proposed act lies in a distant perspective which is a future. The character therefore that we *now* give the thing represents in that sense the importation of the future into the now, or if we ignore the temporal relation of the thing to its "nature," saying here and now the thing has this "nature," we ignore time. Obviously this character does not appear in direct experience.

For an example, I wish to choose a simple perceptual object, rather than an object of physics such as an electron or an atom, so that the conclusion will not seem to have application only to the latter. If we have a small six-sided block, and if we look almost directly at one of the faces, the corners of that face may appear as nearly right angles. But the corners of the other faces that we may see will not. The eye has the thing in perspective and the corners are not interchangeable directly. But we have instruments with which to measure them. With the square and the foot rule we try each corner and edge. Congruency is set up in this manipulatory act, and we ignore the successive character of the operations, saying that the angles or sides are simultaneously equal and interchangeable. The result that we get, therefore, does not appear in any perspective, nor is it directly compounded of perspectives. Mr. Russell's method of getting the "real" penny as a sum of an infinite number of aspects is simply not what we do. We have not followed his method of getting all possible views of the block, far and near. What we get is the result of congruency in manipulation. Present reflection is not responsible for the qualities that now appear in experience, nor is it responsible for the fact that some of those now appearing are more common and enduring than others. But the social mechanism in the individual, of which I spoke at the

beginning of this paper, makes possible the selection and entry of these common elements into the experience of the individual *as common*. The commonness is established in the identity set up by the manipulatory act. We get the "nature," or "inside of the thing," or "what the thing really is," therefore, in manipulation, because there we have congruency and hence identity with the thing. We now say that the block is a cube. The cube is a mathematical object. As such it is the "inner nature" of the block, made up of those characters which appear as identical in manipulation. All else are mere surface qualities.

When we ask what a thing is, we wish to be informed of some character that does not appear in immediate experience, or of some character that will indicate to us many further characters. As Whitehead says, "The shape of a volume is the formula from which the totality of its aspects can be derived."[1] Again, if we see a blue liquid and enquire what it may be, we do not wish to be informed that it is a blue liquid. We already have its surface qualities, so to speak. We want to know its nature—its inside. If we are told that it is a hydrous copper sulphate, or if we are given a formula and if that has any meaning to us, we may be satisfied. To the chemist this is an organization of meanings or possibilities, that will give rise to conclusions under certain conditions.

So far, then, as we read the character into the thing as its *nature*, we say we identify the thing. The reality of this "nature" would exist in our perspective only at the end of an indefinite number of proposed acts. But we say here and now, "this is what the thing is." In so far, time is eliminated and we have a simultaneous world, of what Whitehead called objects in simple location. The elimination of time, or the future as such, means that having the "nature" of the thing is not an awareness of the indefinite number of possibilities, but the *organization* of modes of action that would find their expression in some particular future, as Whitehead suggested in the quotation of the previous paragraph. Apparently, it is a very easy thing to forget that the object is a result of operations, for the very simple reason that we could not carry these operations always in mind. Forgetting, then, we turn the object into a thing-in-itself. For example, one may measure the mass of a body, the distance it travels, and the time of its travel, all of these results being obviously a statement of its relations to other things, and then, denoting these relations, i.e., $\frac{1}{2}ML^2T^{-2}$, by the word "energy" proceed to treat energy as a "something" enclosed within the boundaries of the thing. This localization within the boundaries of the thing of our abstractions, which indicate the possibilities of the thing in relation to

[1] *Science and the Modern World*, p. 95.

other things, is hypostatization. If we were to build a world out of such objects we would then have extended the manipulatory area throughout the universe, getting a world that does not appear in experience, and would perforce have to create some other realm that our consummatory qualities may inhabit.

If we treat scientific results not as results of manipulatory processes dealing with objective things, i.e., not as relative to scientific method, but as somehow already there, then we have absolute objects and out of them we construct an absolute universe. So long as the physicist's interest in the abstracted results led only to a casual interest in his method, the non-experimental character of this simultaneous world, caused by a gratuitous hypostatization, did not trouble him. But the necessity of increasing rigor in dealing with results led him to a vigorous reconsideration of his method. I have in mind, for example, Einstein's account of how he came to make his discovery, turning his attention to the statement of simultaneity in experimental terms. Yet another account by Planck gives an even more interesting insight into the curious working of the human mind. Keeping the old "world of the senses," Planck must keep also the old "real world," which was the physical world of the older scientists. But finding the latter world too substantial or solidified for the technique of his physics, he must needs have yet a third world. The two worlds first mentioned we may dismiss as obviously the carry over of tradition. Of the third, he speaks more instructively. In regard to it, we are warned against "the exaggerated application of the idea of Substance," which he says is primarily useful only in assisting imagination. But it may be asked, if this materialization of physical concepts so assists imagination, is it not very useful to scientific progress? If so, is it not likely to continue; indeed, ought we not to urge its continuance in the future? Furthermore, if it be so useful mayhaps there is a grain of truth to it. This problem is a very important one. In reply to the questions thus raised, one could call many witnesses, as they have been called previously to settle this problem. Chiefest of these witnesses would be the great Newton, to whom has been so commonly and erroneously ascribed the corpuscular theory of light.[2] His war on hypotheses was precisely an attack on the postulation of non-observable entities, although his postulation of the ether is a contradiction to his position. This calling of witnesses, however, would only draw up sides. It would not settle the matter. As another mode of attack, one may point out as Russell did [3] that superstitions

[2] I owe most of my assurance on the point to the splendid but as yet unpublished research on Newton by my colleague, Professor F. C. Becker.

[3] Bertrand Russell: *Sceptical Essays*, p. 40.

of all sorts have "assisted imagination" in science. However, such arguments do not get at the root of the matter, but give a misleading appearance to the problem as though it were a quarrel between metaphysics and positivism. The point that I mean to suggest is that this "assistance to imagination" arises because the location of the "nature" of the thing in the thing here and now, rather than dissipating it, so to speak, in an indefinite number of futures, is a vast simplification, because we can not always carry those possibilities in mind. Yet not only is thought dependent upon this localization because of the simplification involved but more fundamentally because the method is the very symbolic process necessary to thought. Now we have the explanation that I wish to suggest. The error arises in the failure to recognize that the location of the possibilities of the thing within its boundaries as its "nature" is a symbolic or instrumental process. Such a process is no more a "fiction" or an "Als Ob" than is the location of the mass of a body at its center of gravity, or for that matter the use of any sign or symbol. The failure, however, to recognize the instrumental character of the process has a history going back to the time when truths were Eternal Forms and experiments were but temporary and arduous ways of getting them, made necessary by our imperfect, sinful, and finite minds. If we may return to Planck, he goes on to add, "There is only one sure guide towards further development, and that is measurement, together with any logical conclusions that can be drawn from the concepts attached to this method. All other conclusions, and especially those characterized by their so-called self-evidence, should always be looked upon with a certain suspicion."[4] In summary, we may say that the meaning of scientific results must be stated in terms of the actual methods of measurement. Parenthetically, it may be remarked that just for this reason popular books written even by eminent scientists summarizing scientific results may be very misleading. Returning to the main point, Bridgman states pretty much the same thing, "This point of view, that the schedule of operations by which the symbols acquire meaning is as important a part of the physical situation as the relations which are found to hold between the symbols themselves, has a bearing on a very widely spread tendency in modern physics and science in general to see nothing as significant except the relations, and so to reduce all science to a kind of topology."[5]

What then is the nature of the object which is beyond the manipulatory area? In the beginning of this analysis I attempted

[4] Max Planck: *The Universe in the Light of Modern Physics*, p. 78.

[5] "Statistical Mechanics and the Second Law or Thermodynamics," *Bulletin of the American Mathematical Society*, Vol. XXXVIII, p. 236.

the explanation of the more naïve use of the statement "there is an *x*," by saying that under certain circumstances a thing having certain meanings would be perceived. On the other hand, the objects of physics are not perceptual, but are manipulatory. But then using the illustration of the block, a perceptual object, I attempted to show that *qua object* its "nature" is manipulatory rather than consummatory qualities. Thus we can give a more general meaning to the statement "there is an *x*," capable of being extended to the objects of physics or to those of any other science. Stated in a lengthy and awkward manner the meaning is: the full understood conditions being set up for certain expected observable results, we identify the results as the nature of the conditions. The identities specifying the nature of varying conditions may be distinguished by such convenient names as we may care to invent. Anything beyond this is a gratuity useful for salving feelings that belong to simpler, perceptual conditions, but which under radically differing circumstances have not the value of a feeling as to the number of sheets of paper that would be required to make a stack to the sun. So far, then, as we state the nature of the thing, we state it in terms of manipulatory processes that exist in a here and now. It is an extension of the manipulatory area pushed out. It brings the future into the "now" and eliminates temporal distance. Thus it is a logical world rather than a temporal world of history. It is a mechanical world rather than a perceptual world, but as such represents the universality of our hypotheses. Similarly, Max Born pointed out that the absoluteness of space and ether simply meant the generality of mechanical laws.[6] Such a world is indeed as Mr. Russell has suggested, a "public world."[7]

We have suggested the possibility that the physicist's world may be a dead man's world. That would certainly follow the complete isolation of manipulative and consummatory qualities, for man could find no place in a purely manipulatory system. Such has been the conclusion drawn by the materialist, who has considered the physical scientist his friend. This conclusion could also be accepted by the more ascetic Christian through the postulation of another realm for man's escape. It is, however, a denial of any attempt of man to find a home in the world, and hence can have no final acceptance. Thus has the principal of indeterminancy, with so little excuse, become the popular vehicle for the reintroduction of qualities more congenial to the soul of man. I agree crosswise that the Heisenberg principle has significance for the introduction of physics into the world of man. Nevertheless, I have a much more prosaic

[6] *Einstein's Theory of Relativity*, pp. 60–62, 172, 185, 189, 246.

[7] *The Problems of Philosophy*, p. 46.

reason. The principle in a striking way calls attention to the experimental or manipulatory character of knowledge. As such physics is not in contradistinction to consummatory qualities. It is a development of the restless and ceaseless activities with which man ever explores his world, and suggests that were there no men who appreciated great systems of thought there would be no physics. There would then be, and only then would there be, a dead man's world.

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MEDITATION UPON TELEOLOGY

ONE point upon which, I suppose, all naturalists of every shade of opinion agree is a refusal to accept final causes as explanations of the behavior of the universe and to regard the world-process as actuated by purpose. At first sight, indeed, it might seem that naturalism could accept a teleology that merely dramatized the existing situation by holding that nature intends to be whatever she actually is. God, to put it theologically, is a God of Things as They Are. This is very nearly the view of Aristotle, who identified the final and the formal cause, save that for him the natures of things were not laid out beside one another on the flat, but formed a hierarchy.

On second thought, however, the discovery of even so cosmopolitan, broad-minded, and undiscriminating a purpose at work in the world shows that all that glistens is not gold. For we now have all the disadvantages of both final and formal causation on our hands—two methods of explanation whose blighting effects upon progress in science and adventure in metaphysics are only too well known. Indeed, it is one of the many ironies of the history of philosophy that Aristotle, who was himself so naturalistic in spirit, and whose teleology was motivated throughout by strictly scientific considerations, should have set back the flowering of the scientific method and its fruit of modern invention by some seventeen hundred years. It is certainly arguable that had the mechanical theory of Democritus and the habit of explaining events by their antecedents rather than by their consequences prevailed, and had the nascent application of that method by Archimedes to the investigation and control of natural processes not been discarded in favor of Aristotelian teleology, all the triumphs of applied science that exist to-day might have been won for the race as early as the first or second century A.D. Conceivably, Pontius Pilate might have flown to Rome to ask for precise instructions, and the news of the Crucifixion might have been

flashed by radio to the ends of the world and have been read next morning in the papers by the ancestors of the Mayas in Yucatan.

But even if an all-embracing, impartial teleology of this sort were not, in spite of its innocent appearance, destructive of scientific investigation and progress, it would be worse than useless for the purposes for which explanation by final causes is commonly invoked. For teleology is read into the universe primarily as a means not so much of understanding dispassionately its workings as of assuring one's self that those workings are respectable, consoling, and morally edifying to man. Faith in a divine purpose guiding and directing the course of events is, to borrow a phrase from Mr. Kallen, essentially "a compensation in discourse for a disappointment in experience." It is, indeed, so compensatory that by many teleologists final causes are invoked not only to support the interests of man where they conflict with the interests of other living beings and to give him the comfortable feeling that the world process is designed to produce him and to foster his self-fulfilment; they are also supposed to favor the self-realization of those men who are accounted virtuous rather than vicious by their fellows, to prefer Christian to other moralities, and even to reinforce the peculiar views of right and wrong held by some particular Christian sect. For example, to compensate for the disappointment in experience, the Real is frequently supposed to be "dry" rather than "wet" at heart, to frown in its inmost soul upon gambling, and to be secretly an admirer of the late Anthony Comstock.

All this may be true. There is certainly no *a priori* reason why the world-process should not be teleological and moving towards some "divine, far-off event." It may even be the devout adherent of some Christian sect. But the naturalist finds it difficult to draw from an observation of the universe any such pious and edifying conclusion. Indeed, the difficulties of adopting even the broadest teleological interpretation of the world-process seem to him insuperable. For nature, once harnessed to human moral ideals, proves a refractory steed. Far from exhibiting any consistent endeavor to help man win his race, she as often seems intent on throwing and trampling him. Teleologically viewed, she displays no single or final end, but a bewildering confusion of cross-purposes. If she has a mind, that mind is archetypal of woman's traditional privilege of change. No unity of "moral" vision is discernible in her behavior, but rather a variety of conflicting goals at each one of which she can be said with equal reason to be aiming.

Again, if we are to regard the currents in the world-process that bear human life towards self-realization and happiness as intent upon performing that service, we ought logically, if our teleology is

thoroughgoing, to regard the tide-rips that bring ourselves, our hopes, and our ideals to nought as equally intent upon performing that disservice. In short, from a universe wholly motivated by final causes, we are as free to infer diabolism as we are theism; and forced to infer at least (as Plato saw in the *Laws*) the dualism of an evil contriver pitted against a good.

The only alternative is to substitute for an intelligent and designing devil a non-teleological factor like intractable matter, or necessity, or chance. But in that case our world is no longer wholly actuated by purpose; nor, it might be argued from the evidence, is it even surely dominated by the purposive principle. Nay more, we may regard our non-teleological element as obstructing a diabolic rather than a divine design, and see in it, not a limitation upon the exercise of benevolence, but rather a mighty fortress protecting us against the machinations of the powers of evil.

Moreover, if we admit a non-teleological or a non-beneficent factor into our universe, it is well-nigh impossible to limit its scope. The same kick that kicks some people down stairs kicks others up, and it is difficult to say whether the foot within the boot is benevolently or malevolently directed, or whether the impetus imparted in either direction may not be due merely to the mechanical recoil of the foot from an immovable stone. Then, too, if non-teleological activity must be invoked to explain some things, why may it not be called upon to explain all? If it is indifferent to the realization of any particular good, at least it is not deliberately opposed to such realization. There is nothing in the notion of mechanism as such to prevent its grinding us out quite as much good as the most benevolent and untrammeled purpose can produce. And as a matter of fact, the universe, if it is mechanical, is a machine that enables the organisms it manufactures to live and to attain precisely the same amount of self-fulfilment and happiness as is vouchsafed them by a beneficent God. Hence, in a universe of mingled "necessity" and purpose there is no criterion for judging how much of what benefits us is brought about by the one factor, and how much by the other.

Any and every purpose, then, or, in other words, no particular purpose at all, is suggested by the face and gestures of nature, teleologically interpreted. Conversely, the naturalist finds, any and every sort of world seems deducible teleologically from any purpose we may select as the end of the world-process. In fact, almost any end we may hit upon as the goal of creation might conceivably be realized with less waste and overhead than seems to be the case, unless we allow for the interference and obstruction of non-teleological factors that render the choice of the present means merely

faute de mieux. But a choice between equally suitable means for hitting a given target can not itself be made on absolutely teleological grounds, since from the point of view of the purpose in question it is six of one to half a dozen of the other which means are chosen. Nor can it be determined by considerations of expediency in the face of difficult and obstructive "necessary" factors like intractable matter or the devil, since either set of means would serve equally well to circumvent the obstacle. We are reduced, then, to some cosmic equivalent of flipping the coin—in other words, to chance pure and simple, as the determinant of the means employed.

Finally, the naturalist feels, the teleologist treats ends or purposes as if they were somehow self-subsistent and self-explanatory, and floated about in a metaphysical empyrean, all heads and wings and no bodies, like Christian cherubs, without any underpinning to support them. The reason doubtless is, as Spinoza suggested, that men are "conscious of their appetites and desires, but ignorant of the causes by which they are determined to desire anything." The fact and the nature of purposes need explanation quite as much as do the things they are called upon to explain. And, paradoxically enough, ends find their grounds in that for which they are supposed to be the reason. They are rooted in and arise from organisms whose natural endowment and propensities generate them and determine what they shall be. Ends are the projections of desires, desires the offspring of functions, and functions are the expression of structures, which in their turn are fashioned by antecedent events. It looks, then, as if structure and function must exist before purpose can come into being. The teleologist is putting the cart before the horse.

However, the naturalist is far from denying the existence and efficacy of final causes within what he considers their proper sphere. Organisms seem to contain within themselves a curve of growth which they tend to follow in the face of all obstructions. They "endeavor," to use a Spinozistic term, to support, defend, prolong, and reproduce themselves at all costs. When consciousness is superadded to vital activity, those tendencies become desires and seekings, their natural outcomes figure as ends, and the steps by which results are brought about become so many means to hitting a target aimed at in advance. In short, organic functioning irradiated by consciousness *feels* purposive, and conversely, whatever obstructs or disturbs the natural operation of the organism is regarded as an interference with its purpose.

The final cause, then, as viewed by the naturalist, is the light cast by organic impulse upon the road to be travelled, much as the lamps of an automobile illumine in advance its course. As the

organism grows more complicated, that light becomes wider in its spread and more variegated in tint, is thrown further along the route, and reveals more distinctly the objectives to be reached. Finally, the marvellous richness of the spectrum of human impulses and desires projected upon the universe casts upon it the lights and shadows of good and evil and focuses the natural scene about the bright vision of a perfected human life. To this heavenly vision man is not disobedient. All his Herculean effort to remold the world according to his heart's desire—his morality, his art, his theology, the practical applications of his science—bear witness to its compelling force.

Their purely human source and validity does not, however, make these higher values any less high, less splendid, less "spiritual," less authoritative for man. They represent the flowering of *human* life, and the *human* good, as Aristotle remarked, is all that concerns us. That flowering is none the less lovely, that good is none the less divine in the naturalist's eyes, because it is nourished, not by a superhuman and supernatural air, but by the rich soil of mother earth. The naturalist is careful not to confuse the justifications of human aspiration with its origins, or to consider human ideals less ideal and less worthy of worship because they are not suspended from above, but are supported from beneath.

Moreover, he regards it as natural and inevitable that man should endeavor to give to his ideals and aspirations a special cosmic backing by interpreting the world-process teleologically and by identifying the purposes he attributes to it with his own. For any and every event in the universe, precisely because of its local and incidental character, must, if endowed with organic drives and pet desires and aversions, regard itself as the fixed and central point about which and towards which all else moves, and must therefore invest its peculiar perspective and frame of reference with absolute authority. After all, it is the center in which its desires originate and from which they radiate, and if it is to survive it must impose them upon its environment, so far as lies within its power. The lowliest organisms ruthlessly appropriate from their surroundings whatever suits their special needs, and contemptuously spit out, as if it were absolutely worthless, whatever they can not assimilate to their own uses. All the operations of human life merely repeat the ancestral, protoplasmic example in a more complicated way. Tooth and claw are supplemented by machinery, which is nothing but an extension of man's organic sensorium and muscular system furthered by an inventive faculty that is nothing but an extension of animal cunning. So, too, the higher and "spiritual" human values reflect the idiosyncrasies of the human being, and its tenacious pur-

suit of them in the face of all obstacles is but an expression of the primitive self-centeredness and self-assertion without which no organism can survive. No wonder, then, that when facts seem to frustrate the accomplishment of human ends man should compensate for his disappointment by invoking cosmic purposes that reestablish upon metaphysical foundations that importance in the universe of which he would otherwise feel himself deprived.

Hence the naturalist is not unsympathetic with man's effort to coat fact, where it is bitter, with metaphysical chocolate. He expects to find him ingesting, digesting, and transforming into the very substance of truth everything in the world that subserves human ends and suggests a kindred cosmic goal; and on the other hand rejecting as trivial, negligible, and untrustworthy evidence of the nature of Reality everything that has a disagreeable moral or esthetic flavor and therefore ill accords with a teleological interpretation of the world-process. But he suspects that man is more fastidious than the Real, and that the edifying doctrines born of this fastidiousness are more indicative of the temperaments and situations of those that voice them than they are of the nature of the universe; just as our impression that the sun and the planets revolve about the earth throws more light upon our incidental and peripheral position in the solar system than it does upon the real movement of the heavenly bodies themselves. The perspective introduced by teleology into metaphysics he believes to be distorted, and it is an integral part of his naturalism to discount and to correct as far as possible its falsity. That his attempt to rectify is in itself the imposition of a human perspective upon nature he can not and does not deny, nor does he deny the "wishfulness" of his own thinking. It springs from one of the profoundest wishes of the human being—the scientist's desire to know and to face things as they are, rather than as our moral and esthetic yearnings would have them be. His discourse, he feels, is not a compensation for, but an explanation of, the disappointments of experience. His thinking may be wishful, but at least it is not wistful.

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CAN THE LAW OF CONTRADICTION BE STATED WITHOUT REFERENCE TO TIME?

IN the introduction to the Principles of Pure Understanding, Kant deals briefly with the Law of Contradiction, which he treats as the sufficient criterion of the truth of all analytic judgments. He takes occasion to quarrel with a particular formulation of the law:

i.e., "It is impossible that a thing should at the same time both be and not be." He criticizes this statement as introducing empirical considerations into a purely logical formula: "The principle of contradiction, however, must not in any way limit its assertion to time-relations."

There is, I think, behind this criticism an assumption which underlies the whole of his treatment of general, as opposed to transcendental, logic, the assumption, namely, that general logic applies to the possible as well as to the actual. Now, the possible can very plausibly be treated as timeless. What is possible simply is possible and there are no time limitations attached, so that this statement of the law would have no application to the merely possible. If, however, it is meant to apply to the actual: i.e., the world dealt with by the transcendental logic, there is no reason why it should not include a reference to time, as every actual existent is (necessarily, Kant would say) in time.

I propose to argue that the principle deals with the existent and thus necessarily involves a reference to time. This seems obvious in Kant's first example, for a man can not be both young and old at the same time; but, apart from the temporal qualification, there is a sense in which every man is both young and old. How does Kant deal with this difficulty? He says:

> If I say that a man who is unlearned is not learned, the condition, at one and the same time, must be added; for he who is at one time unlearned can very well at another be learned. But if I say no unlearned man is learned, the proposition is analytic, since the property, unlearnedness, now goes to make up the concept of the subject, and the truth of the negative judgment then becomes evident as an immediate consequence of the principle of contradiction, without requiring the supplementary condition, at one and the same time.[1]

There is obviously some confusion here, for it is not at all evident that the second statement does not need the qualification as much as the first. But Kant's meaning can be made clear by the following consideration. Understood extensively, the judgment needs the time qualification and, as it stands, is strictly false. For it means: Of all the unlearned men who have existed, do exist, or will exist, no one is learned. And, as a matter of fact many men have had both characters. Understood intensively, however, the judgment is true and timeless. It means: The complex predicate "unlearned man," is incompatible with the predicate, "learned." This is a strictly universal judgment and has no immediate connection with the existent, so that it is irrelevant, on the view I am advocating to the Law of Contradiction. The Law of Contradiction is a law of coinherence of attributes and what it states is that incompatible

[1] *Critique* A153. B192. Kemp Smith's translation, p. 101.

attributes can not inhere in the same substance at the same time. The temporal qualification is clearly necessary when the law is stated in terms of substance, as a substance endures through time and undergoes changes. I shall consider later whether there are other terms in which the law can be stated and which make the qualification unnecessary.

My conclusion as to Kant is that the distinction he was trying to draw is the distinction between a statement about universals and a statement about particulars. That this is the case is, I think, shown in the following sentence.[2] "The misunderstanding [he says] arises first of all from our separating a predicate of a thing from a concept of that thing." I can not attach any meaning to the expression, "concept of a thing" except "complex attribute," in this case the "being-an-unlearned-man." We separate part of the attribute, "unlearned," from the rest and begin our statement, say:—"A man who is unlearned." Kant goes on, "and afterwards connecting this predicate with its opposite." I.e., we finish our sentence, "is also learned." This, Kant says, is "a procedure which never occasions contradiction with the subject (for learning is just as compatible with manhood as the lack of it), but only with the predicate which has been synthetically connected with that subject." It is necessary here to note the ambiguity of the word, "subject." If it means "substance," as Kant seems to think, the predicate has not been synthetically connected, for, if the subject of our judgment is an actual unlearned man, the predication is the product of analysis and the further predication contradicts the subject; but, owing to the ambiguity of the term used, Kant can argue as if the subject were the universal, "manhood," in which case the subject is not contradicted by either predicate. Kant finishes his sentence in a burst of inconsistency with his general argument: "and even then, only when both predicates are affirmed at one and the same time." In my opinion, this gives the whole case away, and amounts to an admission that the law does not apply to substances apart from the temporal qualification.

The discussion so far would lead us to suppose that there might be two Laws of Contradiction, the one applying to substances and needing the temporal qualification, the other to universals or attributes and not needing to be so qualified. This is, I think, wrong, for I believe that the traditional Law of Contradiction is essentially a law of the co-inherence of attributes, although it has sometimes been confused with a possible law concerning the self-identity of attributes and their relations to each other. For this reason the proper form of the law is that given by Kant, "*A* can not be both *B* and not *B*,"

[2] *Critique, loc. cit.*

for, if the law is to have meaning as applied to substances, the predicate must not be identical with the subject, as indeed it can not be.

It might be supposed that the alternative form, "*A* is not not-*A*" would be the form of the law as applied to attributes and, as far as I can see, this might be the correct form of such a law; but I think it would be misleading to call such a law a Law of Contradiction, as the traditional law of that name presupposes the self-identity of attributes and the relation of predication.[3]

Our question, therefore, concerns the Law of Contradiction as applying to existents. We have to ask whether this law, which is the only true law of contradiction, can be stated without reference to time. The question, I think, is not without importance, for if the law can be stated without reference to time, it implies that an existent can be unambiguously indicated without reference to its time-context. If, that is, we can state the law in the general form, "No existent can have incompatible attributes," we must be able to define existent in a way which:

(1) precludes endurance through time.

(2) ensures that an existent has all its characteristics always and never acquires any new characteristics.

This would be equivalent to disproving the reality of time and change.

It is necessary here to say something more about incompatibility, a relation between attributes which, as we saw, is presupposed by the Law of Contradiction as applying to existents. If the general form taken by the law is to be understood, it must be realized that the negative of an attribute is an attribute incompatible with it. Not-red does not mean either "some-color-other-than-red" or "anything-that-is-not-red"; but simply as it says "not-red," which is a single attribute which is compatible with any other attribute except "red."[4]

This observation will be seen to have some importance later on; but to return to our main problem, it does not seem to me that it has been realized by all logicians. Bradley, for instance, sees no difference in principle between the forms, "*A* is not both *B* and not-*B*" and "A can not at once both be and not be."[5] Notable exceptions

[3] For a very clear statement of this view see Bradley, *Principles of Logic*, I, p. 146. This seems to me unexceptionable, although I can not agree with everything he goes on to say.

[4] The predication of a negative attribute will state a negative fact about a substance. For the development of this conception, see McTaggart, *Nature of Existence*, Section 31.

[5] *Principles of Logic*, p. 146.

are Bosanquet and Mr. Johnson and they both think, I believe, that the law can be stated without reference to time if it is put in the form, "No proposition can be both true and false."[6]

This I think is not true; but, before considering this way of dealing with the problem, which involves the second condition stated above, let us see how the first condition may be met. This is done comparatively easily by substituting "event" for "substance" as an equivalent for existent in our statement of the law above. For an event does not endure through time or only for so short a time that it can not have incompatible characteristics.[7] We thus get rid of the most obvious difficulties such as Kant raises; but only at the price of raising a whole host of others; for an event, although it does not endure through time, is in time and in virtue of this fact seems to have incompatible characteristics. It is in fact on this statement of the Law of Contradiction in terms of events that McTaggart bases his argument for the unreality of time.[8] I.e., Past, Present, and Future are incompatible characteristics of events; but all events have them. Therefore in reality there are no events and there is no time. This argument would be impossible if the temporal qualification were essential to the Law of Contradiction. I think that the qualification is essential whether the law is stated in terms of events or of propositions and therefore that the argument is impossible. Now the opinion that the qualification is not essential arises partly, I think, from the confusion mentioned above with a possible law concerning attributes and partly from the statement of the law concerning existents in terms of propositions. Mr. Johnson argues at length that this formulation is timeless and for this reason contrasts it favorably with the more usual statement in terms of subject and attribute. Like Bosanquet, he relies on the formula "once true, always true," and bases his argument on Bosanquet's distinction between "time of predication" and "time in predication." The former can change, the latter is essential to the proposition itself. He says:

> Taking as examples "The water has a temperature of 30° C." or "Mr. B is at home" we must say on the one hand that if these propositions are true at any time, they are true at all times. But we must not say that if the predicate "having a temperature of 30° C." or the relation "being at home" is true of a given subject at one time, it will be true at all times. This obvious comment would not have been required if language had distinguished in the mode of the verb "to be" between a timeless predication and a tense (present,

[6] Bosanquet, *Logic*, II, p. 210. Johnson, *Logic*, I, pp., 234 ff. The relevant passage in Bosanquet concerns immediately the law of identity; but I think it applies equally to all the postulates of thought.

[7] There would still, of course, be difficulties arising from continuity, but these may, I think, be treated as irrelevant to our purpose.

[8] *Nature of Existence*, Chapter 33.

past, or future). Certain logicians have, however, deliberately denied the dictum that what is once true is always true, and their denial appears to be due to a confusion between the time at which an assertion is made and the time to which an assertion refers; or as Mr. Bosanquet neatly puts it between "the time of predication and the time in predication."

At first sight this does seem, as Mr. Johnson says, "obvious," so obvious, in fact, that it would be madness to quarrel with it. It does, however, need careful examination. If a proposition is to be always true or, indeed, ever true, it must specify unambiguously the fact to which it refers, i.e., it must include within itself the time in predication. This condition seems to be fulfilled by making the subject an event, for an event has only one time, and the proposition, "The event, *A*, has the predicate, *B*" seems to be true for all time so that the Law of Contradiction could be unambiguously stated: "The same event, *A*, can not have the predicates, *B* and not-*B*." But this implies that we are able to give a sufficient description of an event without using any tenses, i.e., we must be able to indicate the time in predication without reference to the time of predication. Otherwise, we can not be sure of what we mean by the same event. If I specify an event, for example, as Caesar's death, it is possible that there might be another event called Caesar's death and sharing all its original, although not its relational, properties occurring two thousand years from now in the future. I can not, then, be sure of what I mean by "Caesar's death" without further specifying it as "the event having the characteristics of Caesar's death and occurring before or after the present." It might be objected that I could specify by reference to another event, e.g., the Great War; but this will lead to an infinite regress unless I can be sure that the Great War is a unique event and a little reflection will show that the only unique thing about it is its temporal position and this can only be specified by reference to the present.

Of course, the second Caesar's death would not be the same event as the first "Caesar's death," but the meaning of two propositions having the first Caesar's death and the second Caesar's death as subjects, unless the relation of Caesar's death to the present were specified, would be the same; i.e., they would be the same proposition and this proposition—e.g., Caesar's death marks the end of the Roman Republic—would be true or false according to which event we were considering, or rather it would be neither true nor false, for it would be ambiguous, while the perfectly unambiguous statement—in its full form, "the event called Caesar's death occurring earlier than the present and later than any other event called Caesar's death which is also earlier than the present (for there might, of course, be two or even an infinity of Caesar's deaths earlier than the present) marks the end of the Roman Republic,"—is true; but it need not re-

main true, so that even of a proposition having any event as its subject we can only say that it can not be both true and false at the same time.

For instance, Mr. Johnson would not, I suppose, maintain that "Mr. Brown is at home" is, as so stated, true at all times; but that it is true at all times that Mr. Brown is at home on August 6, 1932. But his is not the case, unless we further specify "on the only day called 'August 6, 1932' which has occurred up to the present time." Without this qualification the proposition might be false at another time.

It must be admitted, however, that McTaggart is right in stating as a general principle that an event does not change its characteristics. There seems to be only one set of properties which an event can acquire or lose and these are relational properties arising out of a temporal relation to the present. There is, then, only one class of propositions which become true or false, for history, as a matter of fact, does not repeat itself. It may, for instance, become true that at some time earlier than the present I was in San Francisco, which is now false; and it may become false that at no time earlier than the present has a woman visited the North Pole.

It may seem to be begging the question as against McTaggart to argue that events change their characteristics in regard to their temporal relations and therefore that the Law of Contradiction must be stated with reference to time. For he argues that the law must be stated without reference to time and therefore that this change of characteristics is illusory. But I think that the argument is valid if it can be shown that the law stated without the qualification is not self-evident, and that the belief that it is self-evident is founded on a confusion. Both these points have, I think, been made in the course of the discussion. Kant's argument with which we began might be regarded as sufficient proof that the law is not self-evident in this form.

Moreover, the real basis of the argument is the nature of propositions concerning the existent. If a proposition is to be either true or false, it must indicate unambiguously the fact to which it refers, and in the case of propositions about the existent it has been shown that this can not be done without reference to the present time. Consequently it is of the essence of propositions about the existent that those which are true should become false and vice versa.

The becoming false of true propositions depends upon the reality of negative attributes and negative facts as defined above, and this part of the argument is more open to question than that which deals with becoming true of propositions. Dr. Broad, for example, holds that no true proposition ever becomes false; but simply that more

propositions become.[9] If, however, it is the case, as Dr. Broad seems to hold, that the events which are now present are not succeeded by anything, this will be a negative fact which can be stated in a true proposition which will become false. I am not sure that Dr. Broad accepts negative facts of this kind so that this is not brought forward as a valid *argumentum ad hominem* against him.

The results which have emerged in the course of this discussion are, I think, the following:

(1) The Law of Contradiction can not be stated without reference to time.

(2) The belief that it can is founded on a confusion arising out of the facts: (*a*) That there is a law of self-identity of attributes which seems very like the Law of Contradiction and which can be stated without reference to time. (*b*) That there is a form of the law of contradiction which it is very plausible to represent as free from time conditions.

It has incidentally emerged, I think, that the attempt to prove the unreality of time on the supposition that the Law of Contradiction can be stated in terms of events without reference to time is based on a false premiss and is therefore fallacious.

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BOOK REVIEWS

The Problem of Error from Plato to Kant. A Historical and Critical Study. LEO W. KEELER, S.J. (Analecta Gregoriana, Vol. VI.) Rome: Pontificia Universitas Gregoriana. 1934. xiii + 282 pp. 15 Lire.

In ten successive chapters, Father Keeler searches for a doctrine of error in the works of the pre-Socratics and Plato, Aristotle, the Skeptic, Stoic, and Epicurean schools, Augustine, Aquinas, Scotus and the Spanish Scholastics, Descartes, Spinoza, the British philosophers, and Kant. He is convinced that a history of the problem of error is of crucial significance to epistemology, since "a theory of knowledge, to be acceptable, must necessarily make room for a complimentary theory of error" (p. ix). Yet he finds that the fact of error raised an important philosophic problem for only three of the great philosophers, Plato, St. Augustine, and Descartes, and even these three failed to formulate an epistemology adequate to account for error. The pre-Socratics did not recognize the real existence of error; Aristotle thought to dispose of the problem by certain on-

[9] *Scientific Thought*, p. 83.

tological and logical principles; the post-Aristotelians made error depend on the will, but fell into skepticism, or were prevented by their materialistic sensism from accounting for error; after Thomas Aquinas, Scotus, and the Spanish Scholastics marked a retrogression, and after Descartes, modern philosophy fell into a similar confusion concerning error: Spinoza throws us back to the position of the ancient Eleatics, Hume to that of Protagoras (though both fail to recognize, as the ancients had, that by their principles error would be impossible), and though Kant's position might be developed to yield a coherent explanation of error, it presents great difficulties as stated by Kant. Of all the philosophers who pass in review, Thomas Aquinas comes nearest to a satisfactory solution, for although he tends to reformulate and elaborate the teaching of Aristotle (in whom no satisfactory discussion of error can be found), the influence of Augustine forces him to a consideration of the problem. Father Keeler's findings may be summarized in the statements that the problem of error exists for every philosophic system, that it is discussed explicitly only in few, that it is discussed satisfactorily in none. If the reader had hoped for a solution of the problem in its history, he would have anticipated the author in his conclusion that "the result is frankly disappointing" (p. 277).

Father Keeler's book is more valuable for what it illustrates than for what it states. As Father Keeler envisages the problem of error, it is recognized only in the Platonic tradition, but it can be solved satisfactorily only with the aid of Aristotelian distinctions. It would hardly be a caricature of his conclusions to say that, following his exposition, one tradition of western philosophy recognized the existence of error, but was unable to account for it, that all the remaining philosophers were able in varying degrees to explain the nature of error, but were constrained, in the degree in which they were successful in explaining its nature, to deny its existence. As Father Keeler sees it, the problem centers about judgment and assent; apparently in the history of philosophy two reasons have been suggested for assent to what is false or the judgment that the false is true, that is, for the occurrence of error—the unreliableness of our cognitive faculties and the perversity of free will. Both solutions are unsatisfactory: the latter, since will alone is insufficient to force the assent of the understanding, and error becomes unintelligible; the former, since understanding assents only to what is known, and when we try to determine what we know when we err, error becomes indistinguishable from knowledge. Apparently the virtue that Father Keeler finds in Thomas Aquinas lies in the fact that he raises the problem in almost that form: he treats error as assent, under the influence of the will, to the reality of something we do not

know. Apparently his weakness lies in the fact that he is unable to explain the nature and possibility of such assent (p. 103). What would be involved in that further task is not clear, for Father Keeler closes his book with the remark that happily the formulation of a positive and complete theory of error falls outside the scope of his study (p. 278). Moreover, the frequency with which philosophers are convicted of failure to recognize important problems and the ease with which equivocations and ambiguities that escaped them are discovered, may arouse the reader to some doubt concerning the happiness of Father Keeler's conclusions. He has shown, not that the problem of error has been ignored or treated ambiguously, but that it has varied from philosophy to philosophy. He has shown that no philosopher has considered the problem in the form in which he approaches it, but he has neglected to show that it is intelligible or that it is a problem in that form. Even the palm which is granted to Plato, Augustine, and Descartes, viewed critically, changes significance: the chapters on those philosophers are the most satisfactory in Father Keeler's book, whereas his treatment of Aristotle, Spinoza, Kant, might be found to be partial, unsympathetic, and false to the spirit of those philosophers. Father Keeler's learned and able excursion into the history of the problem of error is interesting as an illustration of the relativities and shifts of philosophic and historical exposition and of the transformations involved in philosophic criticism. In particular, it is a useful reminder that the search, so frequently undertaken in philosophic writings today, for predefined concepts in past philosophies (usually to discover that they are not there), though useful as a rhetorical device, is of doubtful value as an instrument of philosophic research or criticism.

R. McK.

Le Transfini. Sa Logique et sa Métaphysique. MARCEL LALLEMAND. Paris: Desclée De Brouwer et Cie. 1934. 302 pp. 25 fr.

This is an interesting addition to the series of books on philosophy edited by M. Maritain. Of the three parts into which the book is divided, the first is devoted to a brief but lucid exposition of classical *Mengenlehre.* In the second, M. Lallemand takes issue with Cantor's view that the integers constitute an "actual" infinite. He argues that the ascription of cardinality to infinite "collections" of numbers is illegitimate, because Cantor's definition of equality presupposes a determinate *order* in which the elements of such "collections" must appear in order that the relation of similarity be established between them. M. Lallemand's thesis is that a class has a cardinal number only when, independent of the order of its elements, it is similar to some portion of the series of integers. Hence the first *aleph,* and *a fortiori* all the others, are simply signs for

the indefinite but determinate progression of a series. The diagonal proof for the non-denumerability of the continuum is interpreted to mean that a series which is not generated by a determinate principle can not always be ordered as is the series of integers. The final part of the book is devoted to answering those theologians who deny the possibility of an actual infinite, and in an appendix summary justice is done to contemporary finitists. For strangely enough, M. Lallemand argues for the possibility of an actual infinite collection, e.g., of stars, which would be present to the divine intelligence as a finite collection of objects is to men. But this thesis, as well as the view that while God can have present to him such an actual infinity but not *as* enumerated, is sustained by shockingly bad arguments. M. Lallemand's criticism of the Cantorians places him definitely among those who, on methodological grounds, must reject an "actual" infinite; and from this point of view his support of a non-Cantorian actual infinite is an irrelevance in his book. E. N.

S. T. Coleridge's Treatise on Method as published in the Encyclopædia Metropolitana. Edited with Introduction, Manuscript Fragments, and Notes for a Complete Collation with the Essays on Method in "The Friend." ALICE D. SNYDER. London: Constable & Co., Ltd. 1934. xxviii + 92 pp. 6/.

Coleridge wrote a "General Introduction" for the *Encyclopædia Metropolitana.* This introduction appeared in the first volume of the Encyclopædia in 1818, though in a form which Coleridge considered "garbled." The connections of Coleridge with the Encyclopædia (which were originally planned to be intimate and extensive) ended with the first volume. The manuscript of the "General Introduction" is lost, so that the exact form of Coleridge's writing can not be ascertained. Much of the material, with long passages repeated *verbatim,* was used again by Coleridge in an enlarged edition of *The Friend* (also in 1818).

Miss Snyder of Vassar College has edited the "General Introduction," which has not been easily available to students of Coleridge. The chief value of her edition is for textual criticism. The ideas of Coleridge—his estimates of Bacon and Plato, his theory of knowledge, his fundamentally moral standpoint—are well enough known from other readily available works. Yet one point of philosophical interest is brought out by the "General Introduction" which would be largely missed in a reading of the kindred material in *The Friend.* This point is that Coleridge saw the constitutive and unifying function of Mind as enabling all knowledge to be presented, not in a series of separate articles arranged according to the alpha-

betical order of their initial letters, but in a synthetic and integrated order of the progressive development of ideas. For the *Encyclopædia Metropolitana,* unlike the *Britannica,* felt Coleridge's influence in seeking to present all knowledge as one rational whole.

S. P. L.

The Elder Henry James (1811–1882). AUSTIN WARREN. New York: Macmillan Company. 1934. xi + 269 pp. $2.50.

The father of William James here comes forth clearly as a philosopher in his own right. Professor Warren has succeeded by this admirable portrait of Henry James's mind in making it significant not merely as a background for the more famous Jameses, but as a comprehensive and ingenious system of speculation and philosophic insight. Especially the chapters entitled "Swedenborg," "Fourier," and "The Philosophy" can be recommended to philosophical readers as certain to present them with a type of thought at once unconventional and universal, original and yet expressive of the basic themes of all philosophy. The elder Henry James, inheriting the humanitarian enthusiasms of the Revolutionary generation and stumbling upon the terminology of eighteenth-century Christian liberalism through the writings of Swedenborg, developed a system of Christian socialism and humanitarian theology which, though similar in many ways to the allied systems of Comte, Fourier, and the Swedenborgian liberals, is nevertheless a unique and impressive philosophy. It is unfortunate that readers will attempt to estimate this philosophy in terms of that of William James, and Professor Warren does well to underestimate the influence of the ideas of the father on the minds of his sons. The cosmopolitan education and independent temper were shared by father and sons, but the categories and problems of the two generations were quite different. It is no less unfortunate that the author in his "Epilogue" has yielded to the temptation to look at Henry James through the perspectives of our own generation and to project his socialism or associationism against the ideology of the labor movement. The book as a whole, however, is remarkably true to the *milieu* of its subject and the author's generous use of quotations enhances the liveliness and accuracy of the narrative. Perhaps Professor Warren's enthusiasm is contagious, but the reviewer can not escape the feeling that the elder Henry James has a style so much more sincere and good-humored than that of the younger, and a mind so much more catholic and speculative than that of William, that the father may yet outlive his sons. For his sons were essentially representative of a generation; he, on the contrary, was an

individual, at odds with his civilization, emancipated from his contemporaries, yet conversant with the philosophical language of many ages, who, as such, may appeal to any generation.

H. W. S.

Le Nouvel Esprit Scientifique. GASTON BACHELARD. Paris: Félix Alcan. 179 pp. 10 fr.

M. Bachelard's litttle book is one of the series edited by M. Delacroix called the *Nouvelle Encyclopédie Philosophique.* In it he tries to erect a "non-Cartesian epistemology" on the basis of the new physical science, which, he maintains, employes a type of thinking not used in the old. In most general terms this epistemology may be described as one which abandons the fundamental metaphors of substance and thing, for that of function. The difficulties of the subject-attribute logic have been pretty well exploited in recent times and it does indeed look as if quantum mechanics and molecular statistics were not conceived in accordance with its technique. M. Bachelard has made another good statement of these difficulties and a persuasive plea for a recognition of this new type of thinking in epistemology. The author of this notice, although sympathetic with this point of view, feels that the time has come to stop leading for a reconstruction and to begin making it. He is of the opinion that when such a reconstruction is seriously attempted, it will be found that while the things now inadequately expressed by Aristotelian logic will no longer cause difficulty, the things which Aristotelian logic did express adequately will suddenly take on the appearance of puzzles. He can, to be concrete, see why Aristotelian logic (and its corresponding epistemology) can not handle "It is raining," but he can not see how the new logic (and its corresponding epistemology) can handle "The ink is black." G. B.

The Architecture of the Universe. W. F. G. SWANN. New York: The Macmillan Company. 1934. Pp. ix + 428. $3.75.

This is another attempt to explain current physical theories to the layman. A pretty good attempt some may find it, for different minds find different approaches helpful. Others will think it tiresomely wordy, and the elaborate analogies less clear than straight description. Dr. Swann tries valiantly to make the scientific point of view seem reasonable, but not all scientists would recognize this portrait of themselves. The philosophical comments are not unworthy of respect, but the author lacks the acute originality of an Eddington, and has something less than the Jeans' quality of pictorial intuition.

After preliminary historical remarks, there is an excellent long chapter on the atom. Then follows a semi-philosophical discussion concerning the sense in which we are dealing with "reality" in an atomic theory. After a chapter on the laws of thermodynamics, good but not novel, come comments on the "fate of the universe," only partly adequate to their great scheme. But the popular expositor can hardly keep us abreast of all the exploding theories of the exploding universe. There then follow discussions of the meaning of "dimensions," of relativity, and of space and time. A great deal of this rather laboriously develops the obvious for the philosophical reader, and leaves him unsatisfied about the real difficulties. The book closes with chapters labeled "Vital Processes" and "Science and Theology," not without merit but not profound. As a whole the book is recommended reading, but not indispensable.

H. T. C.

OTHER NEW BOOKS AND JOURNALS

PHILOSOPHY OF SCIENCE. Vol. I, No. 3. The Method of Physical Coincidences and the Scale Coördinate: *Wm. Bender.* Beyond Mechanism and Vitalism: *E. A. Singer, Jr.* The Problem of Vital Organization: *R. S. Lillie.* The Views of Haeckel in the Light of Genetics: *H. J. Muller.* Freud and the Scientific Method: *J. F. Brown.* Scientific Method and Social Science: *Joseph Mayer.*

THE AUSTRALASIAN JOURNAL OF PSYCHOLOGY AND PHILOSOPHY. Vol. XII, No. 2. Mind as Feeling: *John Anderson.* Four Men Talk about God (I): *R. P. Anschutz.* Locke's Theory of Knowledge (I): *H. H. Ferguson.* Fact and Ideal in Political Theory: *A. Boyce Gibson.* Academic Freedom: *W. Anderson.* An Experiment with the Crichton Test: *P. M. Bachelard.*

REVUE DE MÉTAPHYSIQUE ET DE MORALE. 41e Année, No. 3. L'Oeuvre Scientifique de Paul Painlevé: *J. Hadamard.* L'Esthétique de Schleiermacher: *B. Croce.* Lumière et Substance: *G. Bachelard.* L'Astrobiologie et la Pensée de l'Asie: Essai sur les Origines des Sciences et des Théories Morales (suite): *R. Berthelot.* Le Problème du Choix, l'Existence et la Transcendance dans la Philosophie de Jaspers: *J. Wahl.*

REVUE PHILOSOPHIQUE. 59e Année, Nos. 7 et 8. G. W. Leibniz. Lettres et Fragments Inédits concernant les problèmes philosophiques, théologiques, politiques de la réconciliation des doctrines protestantes (1669–1704), publiés avec une introduction historique et des notes par *Paul Schrecker.*

ARCHIVIO DI FILOSOFIA. Anno IV, Fasc. 2. Il nuovo realismo: *F. Orestano.* Sul problema del rapporto tra scienza e filosofia: *A.*

Banfi. Sulla intuizione logica secondo la logica del potenziamento: *A. Pastore.* Pensiero ed esperienza: *F. Lombardi.* Il ritorno di Cartesio: *A. Lantrùa.* Una nuova fase degli studi di filosofia del diritto di G. Del Vecchio: *G. Gonella.*

GIORNALE CRITICO DELLA FILOSOFIA ITALIANA. Anno XV, Fasc. 3. Elementi di storia della logica: *G. Calogero.* Il platonismo del Rinascimento italiano e la dottrina degli oracoli caldaici: *B. Kieszkowski.* Il pensiero filosofico di Maurizio Blondel nel suo sviluppo storico: *G. Durante.* Il pensiero filosofico dei fisiocritici: *S. Corti.*

PHILOSOPHISCHE HEFTE. IV. Jahrgang, Heft 3/4. Sonderheft: Ontologie der Gegenwart Deutscher Antitraditionalismus Französischer Traditionalismus. Kritik der Schelling-Jaspers-Heidegger'schen Ontologie: *Maximilian Beck.* Traditionalistisches Schrifttum und Tradition in Frankreich: *Siegfried Lang.*

SCIENTIA. Vol. LVI, N. CCLXVIII–8. Sul più lontano avvenire dei sistemi planetari: *G. Krall.* Théorie coordinative de la constitution des composés organiques et métalloïdiques: *G. Urbain.* Biology in Relation to some Present-Day Problems: *H. B. Fantham.* Die Sprachatlasarbeiten der Welt. II Teil. *S. Papp.*

NOTES AND NEWS

Dr. Homer H. Dubs, Professor of Philosophy at Marshall College, is taking a year's leave of absence to engage in research work at the Library of Congress for the Committee on Chinese Studies of the American Council of Learned Societies. The work he is to do is a partial translation of one of the Chinese dynastic histories, the Ts'ien Han Shu.

Dr. Paul Russell Anderson, formerly Associate Professor of Philosophy and Religion at MacMurray College, has been appointed Professor of Philosophy at Lake Erie College.

Professor Max Wertheimer, formerly of the University of Frankfurt, and a distinguished representative of the Gestalt theory of psychology, is now a member of the Graduate Faculty of Political and Social Science of the New School for Social Research in New York. Professor Wertheimer will give a seminar on the Gestalt theory. While it is intended primarily for psychologists, it will also stress the implications of the Gestalt theory for teachers, physicians, psychiatrists, and will indicate the rôle of psychology in the various fields of science.